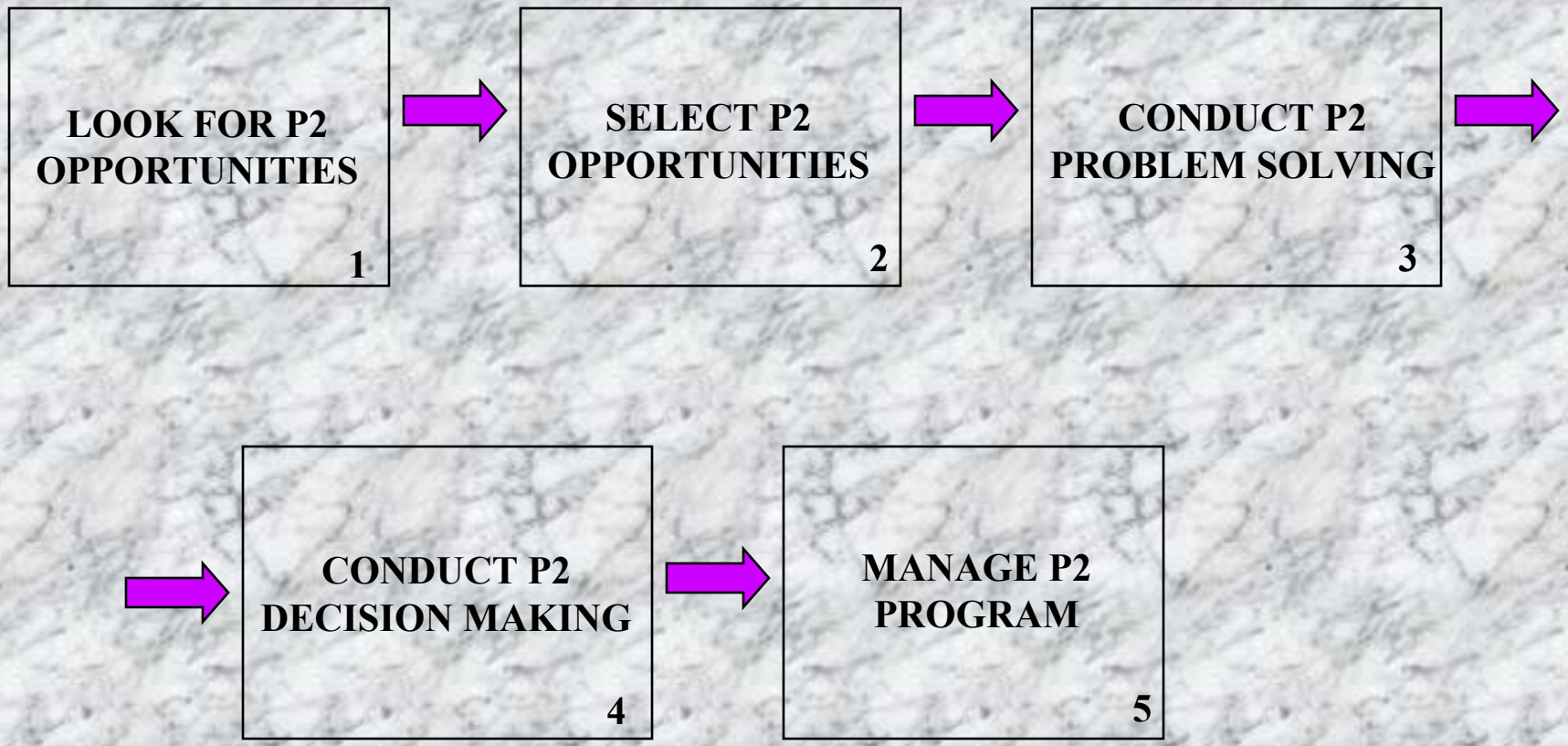
MI DEQ & RETAP Pollution Prevention (P2) Training

In Living Color: Painting Pollution Prevention

Cam Metcalf, Executive Director
Richard Meisenhelder, P2 Specialist
Lori Hoetker, Technical Coordinator
Kentucky Pollution Prevention Center (KPPC)

Kentucky Pollution Prevention Center

An Alternative Approach to a P2 Program



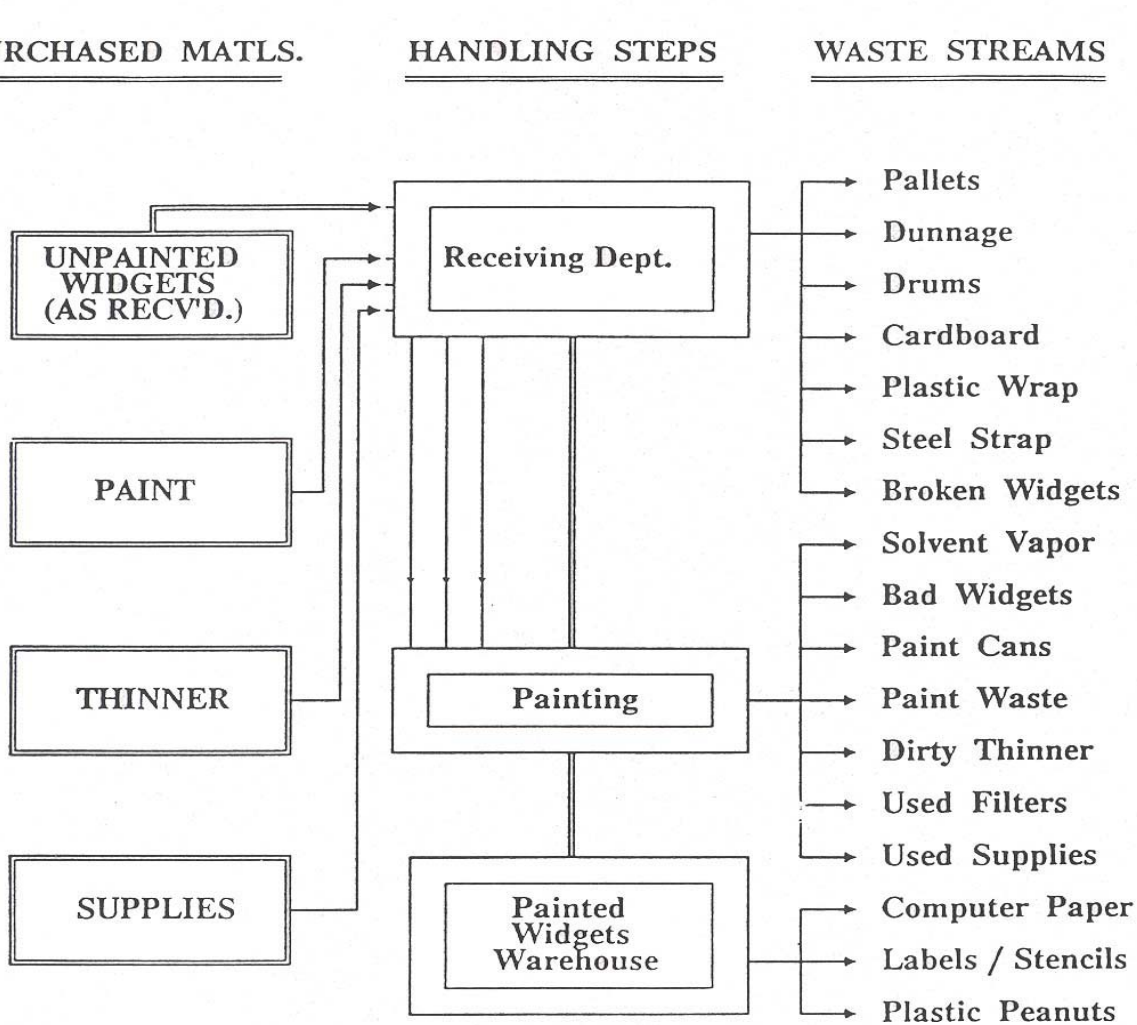
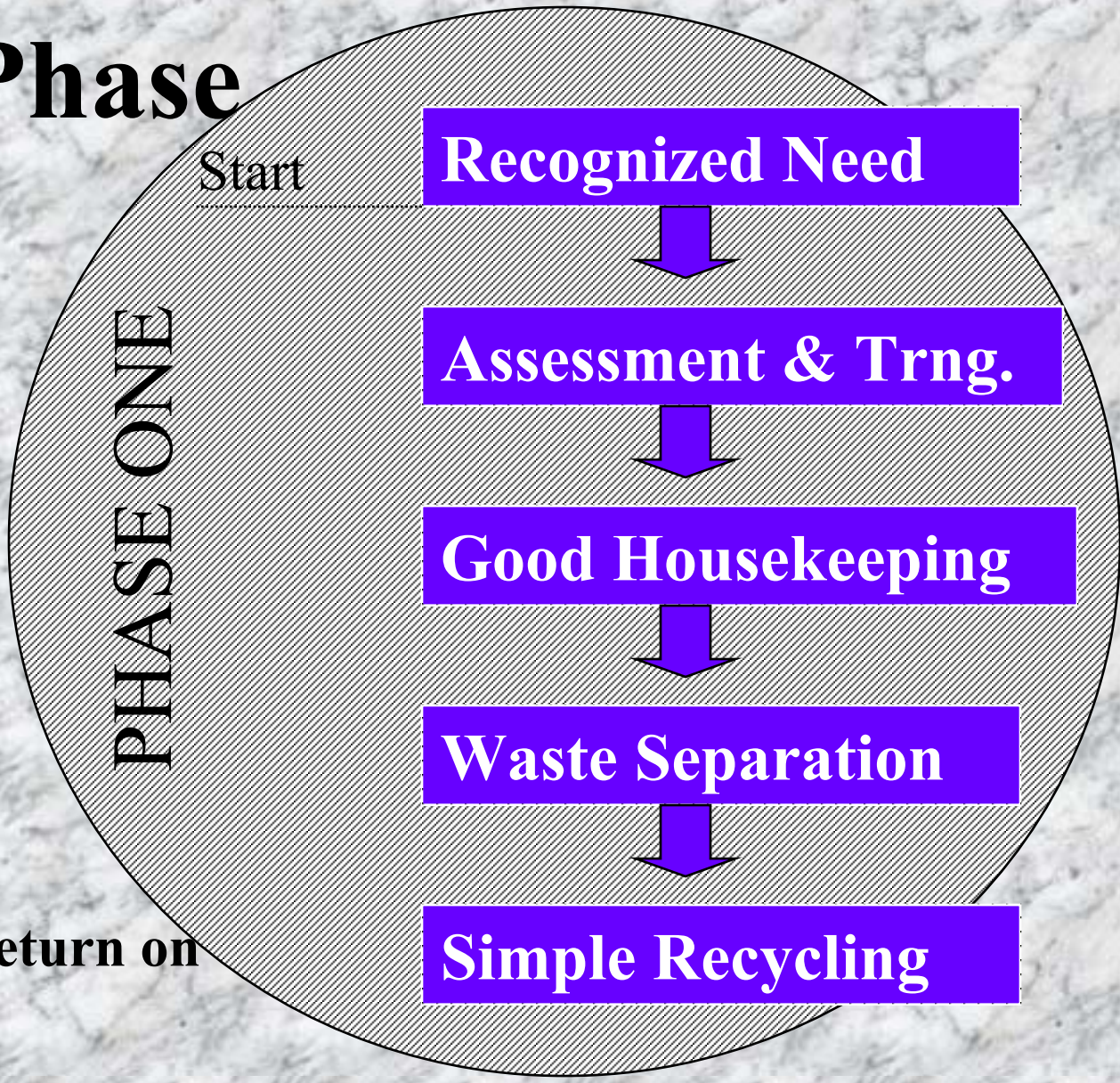


CHART OF ABC's PAINTING PROCESS

Waste Reduction Operation Phase



0-6 months, Big Return on Investment

Practical Considerations

- Painting is:
  - A “Necessary Evil”
  - A “Step-Child” Operation
  - A Messy One at That!!
- It’s usually one of the Largest Sources of waste in the plant!
- Managers have been sold on “Sacred Cows”
  - Don’t change the way painters do things!
  - Waste is an inevitable part of product cost!
  - If it ain’t broke, don’t fix it!!!

Management "HOOKS": True Cost of Paint Wastes

- VOC Emissions
  - Purchase price of all that solvent!
  - Are we close to permit limits?
  - Could we get increased limits if we tried?
  - Would we have to refuse new business not to exceed our limits?
- Special Wastes
  - Booth Scrapings, Filters & booth liners
  - Watercurtain skimmings

Management "HOOKS": True Cost of Paint Wastes

- Wastewater
  - Is "Goop" from curtainwater causing major probems?
  - Are we paying extra for BOD, COD or Metals?
- Cost Accounting: Few companies really know the cost of their paint waste!
- Show them needless waste factored into "Standard Product Cost" & "Hidden Costs" in Overhead!

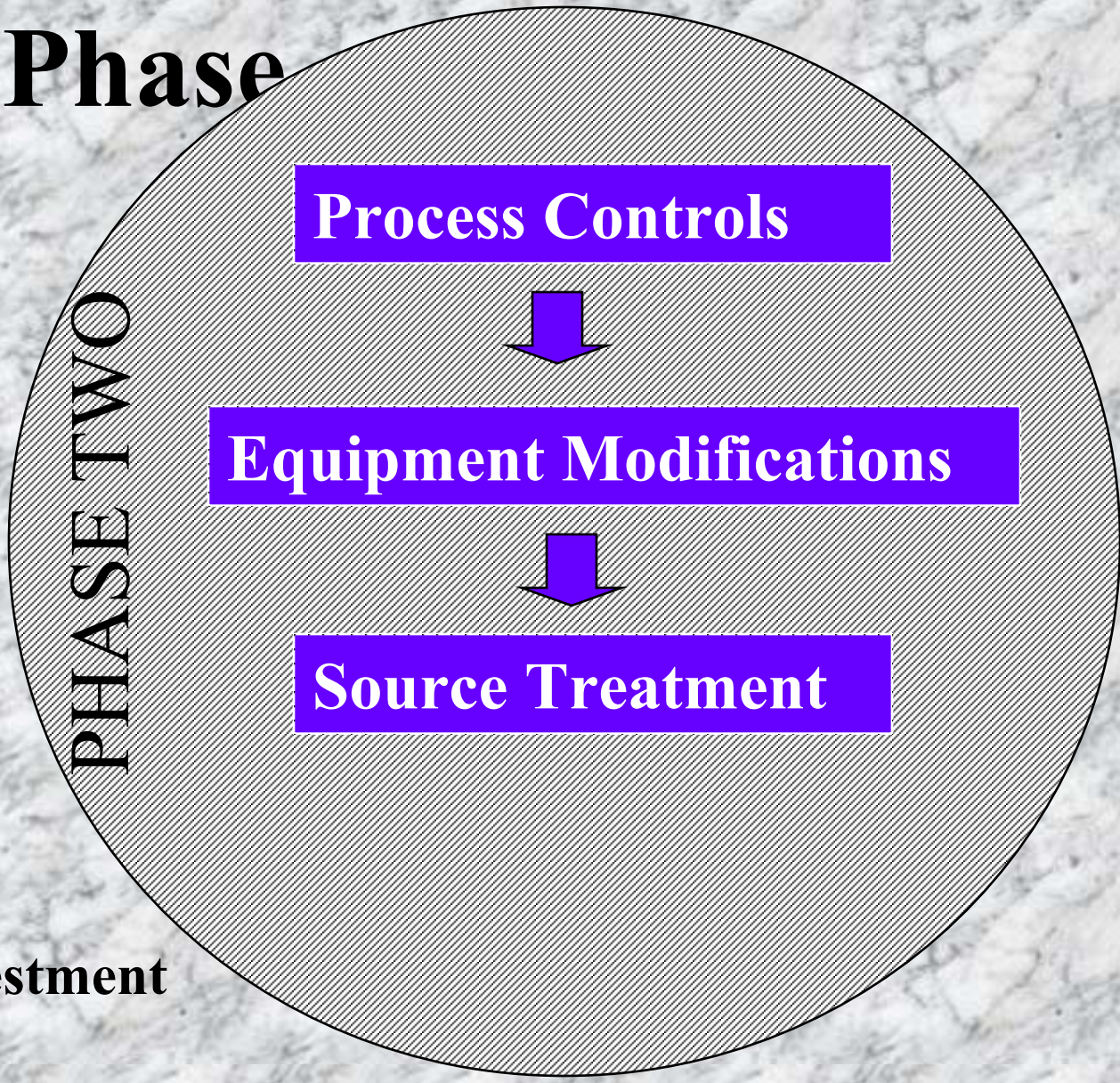
Coating Application Process Wastes

- Leftover paints
- Cleaning solvents/thinners
- Air emissions (VOCs & HAPs)
- Spray booth filters
- Soiled rags
- Expired shelf-life inventory

P2 in Coating Application Processes

- Inventory control
- Good housekeeping practices
- Proper paint mixing
- Increased operator training
- High transfer efficiency equipment
- Proper cleaning methods/Reduce toxicity
- Alternative coatings
- Reuseable paint booth filters
- Recycling/reuse of solvents
- Using materials exchanges

Waste Reduction Equipment Phase

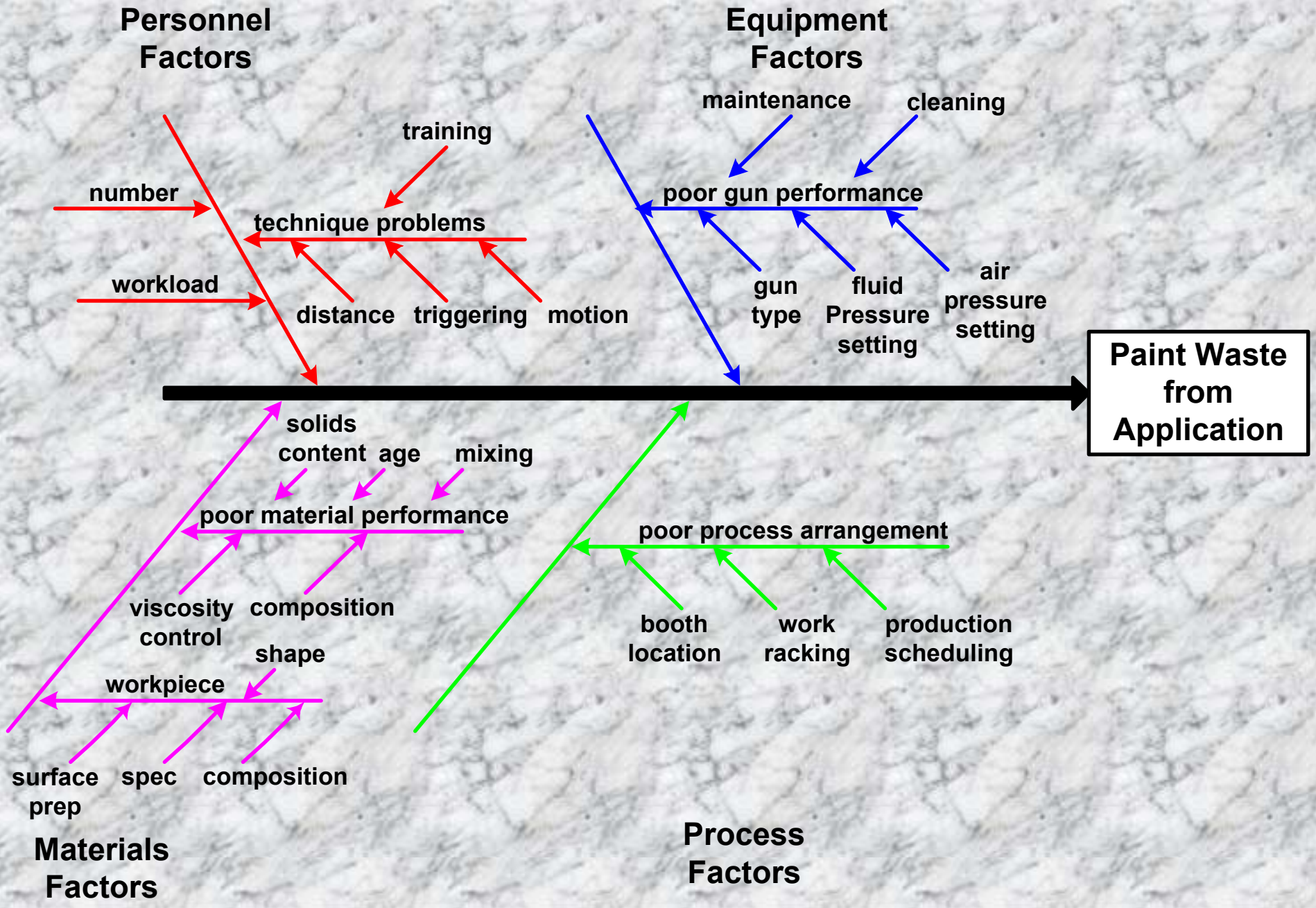


6 months - 2 years
Some Return on Investment

P2 for Spray Painting

- Gravity-Feed Guns
- High-Volume, Low-Pressure Guns
- Electrostatic Guns
- UNICARB™ Spray System
- Rotary Atomization
- Powder Coatings
- Electrocoat
- Roller coating

Sample Diagram for Painting Operations

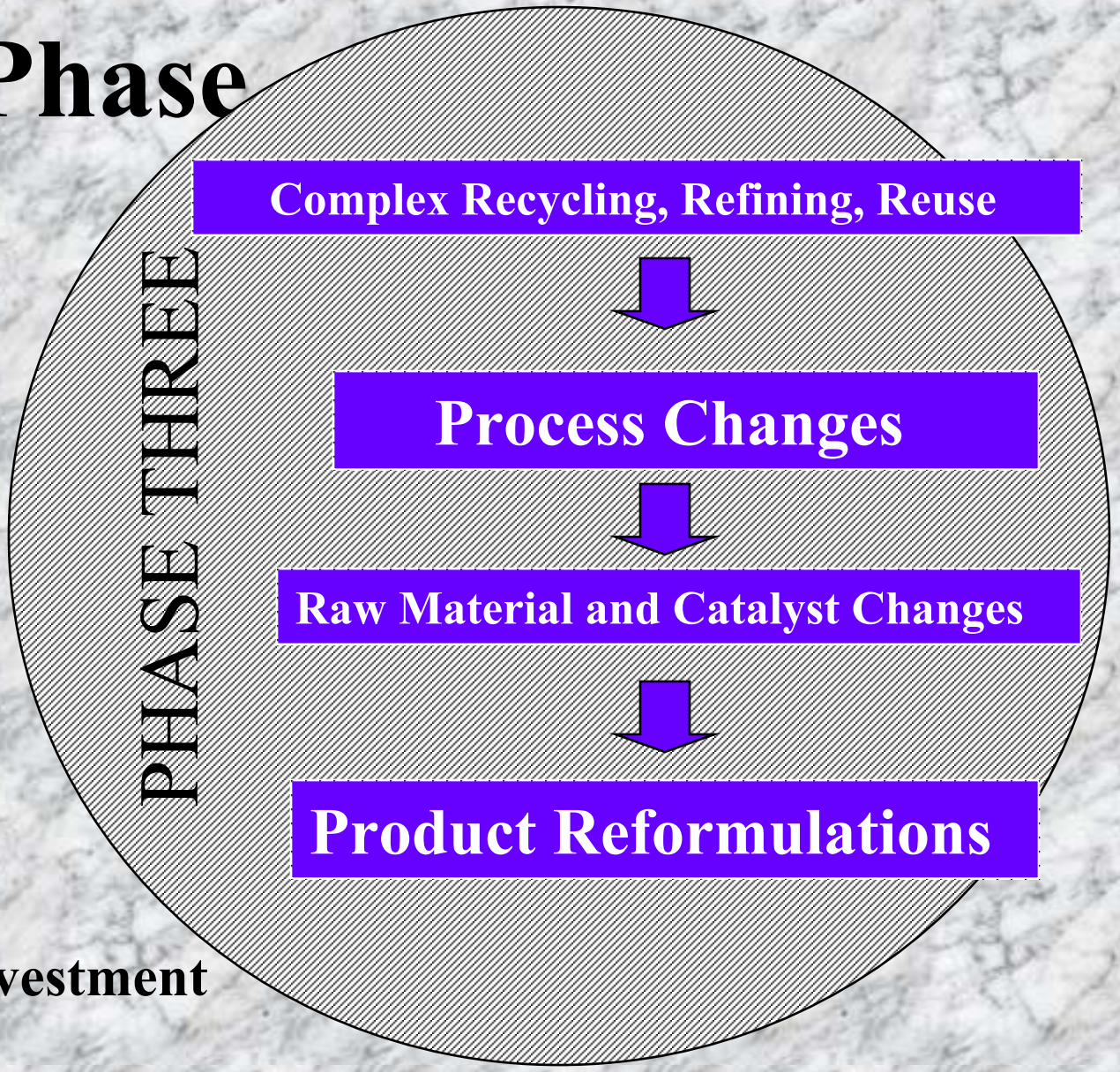


Spray Painting Survey

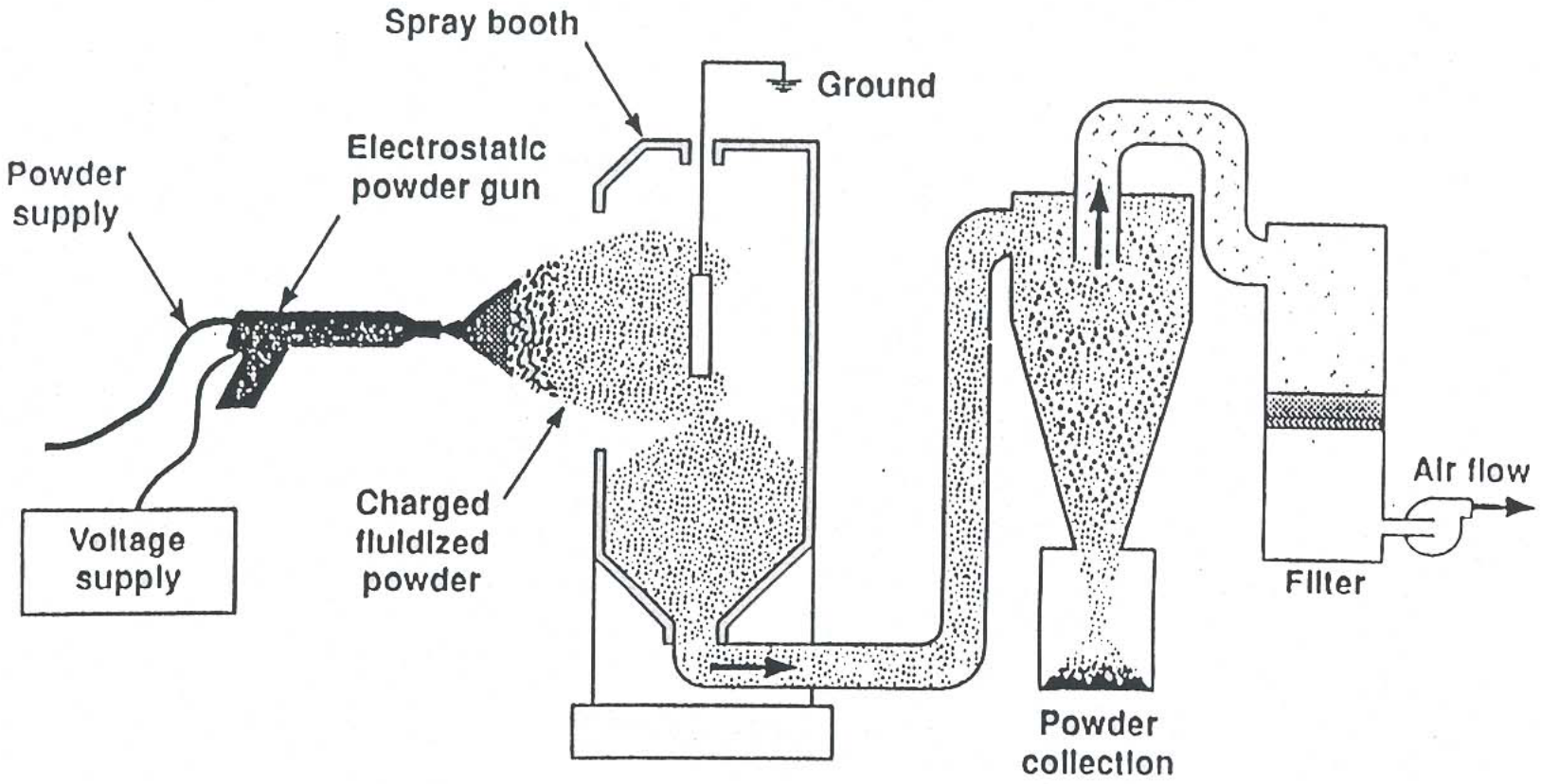
- Air-atomize guns 64%
- Airless guns 22%
- Air-assisted airless guns 17%
- HVLP guns 37%
- Electrostatic equipment 42%
- Plural-component 11%
- Liquefied CO2 application 2.5%

Products Finishing Survey (240/711)

Waste Reduction Process Phase



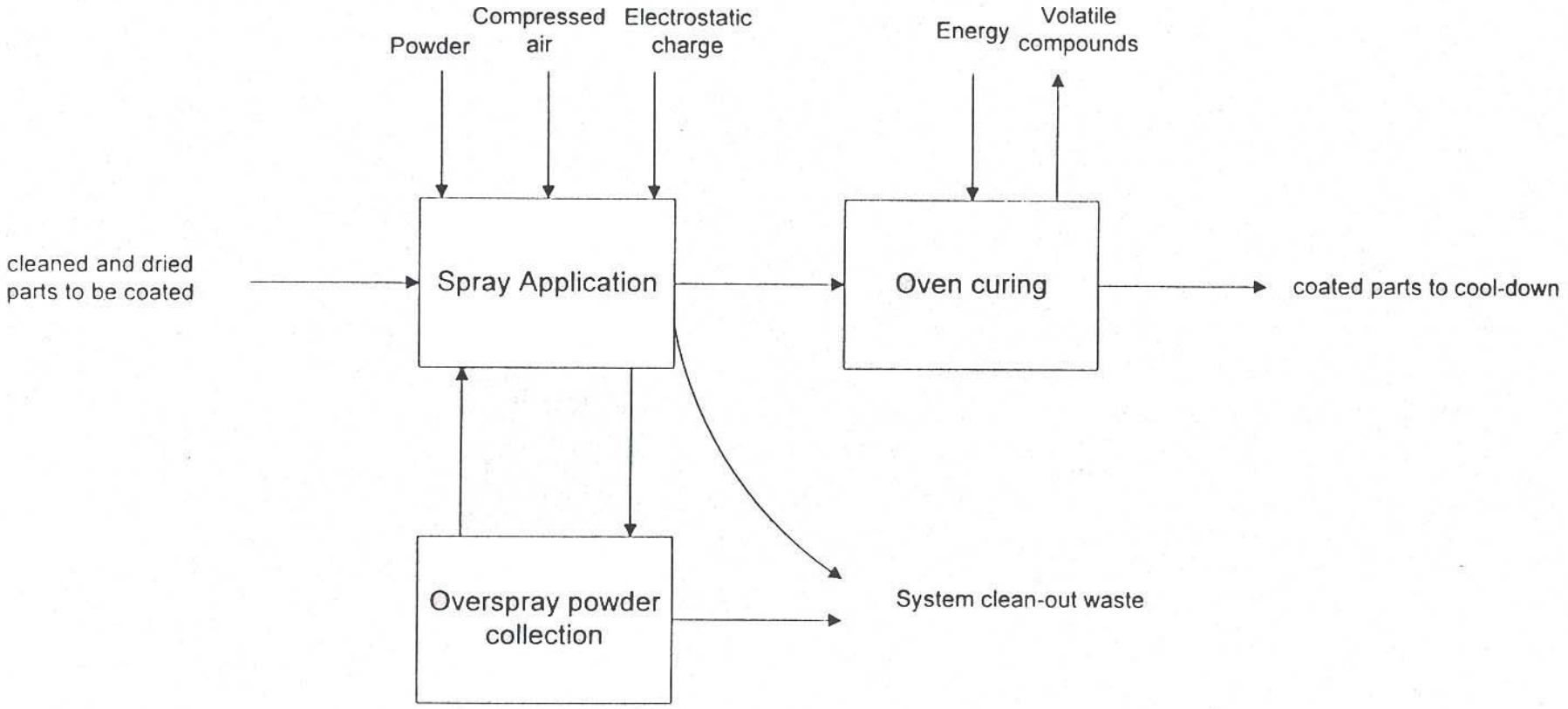
2 years - 5 years
Little Return on Investment



Source: Battelle

Figure 4. Powder Coating Recovery System.

Subprocess Flow Diagram
Electrostatic Spray Powder Application



When Management Re-Thinks Painting: Gov. Award Winner

- Rebuilt paint room to handle color changes
- Replaced solvent pre-cleaning with aqueous
- Revised spray system for low-VOC paints
- Installed thinner recovery system
- Found a way to reuse solvent still bottoms
- Changed paint booth filters to reuseable EPS & then dissolve them in thinners

Paint Pigment Manufacturer

- Company Generates 550 Gallons of Waste Paint/Month
- 403 of 550 Gallons are Distillation Bottoms

Paint Pigment Manufacturer

- Distillation Bottom Composition
  - Pigments (5-30%)
  - Resins (5-30%)
  - Solvents (50-80%)
  - Metallic Dryers
  - Antiskining Agents
  - Antisettling Agents
- 20 Samples: Average % by Weight:
  - ✓ Solvents 50.76%
  - ✓ Organics 30.79%
  - ✓ Inorganics 18.45%

Paint Pigment Manufacturer

- Explore Opportunities
  - Automotive Undercoat
  - Asphalt/Concrete Sealer or Filler
  - Wood Fences & Barn Paint
    - ✓Most of Necessary Ingredients Present
    - ✓Developed Economic Projections for this Opportunity

Paint Pigment Manufacturer

- Economic Benefits
  - $30,000 Profit from Product Sale
    - ✓ $40,000 Revenue Minus $10,000 Cost of Production
  - Plus $10,000 Avoided Disposal Costs
  - Equals $40,000 Annual Savings

1991 Sludge Disposal Cost
25 cents per gallon

DATE	QUANTITY
2/20	5,700 gallons
4/8	3,500 gallons
8/6	4,500 gallons
8/6	4,000 gallons
10/10	3,500 gallons
12/2	4,200 gallons

1991 Hazardous Waste Disposal Fees = $32,000/yr..

Spray gun cleaner-Xylene
100 gallons/quarter

High solids paint
300+ gallons/quarter

Waste oil (vanishing oil)
800+ gallons/quarter

Petroleum solvent asphalt blend
300+ gallons/one time only

Solid Waste Analysis

	SIZE YDs^3	WEIGHT LBs	HAUL FEE YD	HAUL FEE TON	TIPPING FEE '91/'92
LUMBER	40	5,000	$2.00	$32.00	$72.00/ 120.00
TRASH	42	10,000	$1.90	$16.00	$37.80/ 63.00
PAINT SLUDGE	20	14,000	$4.00	$11.40	$12.86/ 21.43

Solid Waste Estimates
‘91 - ‘92

HAUL FEE + TIPPING FEE = COST PER TON

Waste	Haul	Tip	Cost/Ton	
Lumber	$32.00	$72.00 {120}	$104.00 {152}	(’91) {‘92}
Trash	$16.00	$37.80 {63}	$53.80 {79}	(’91) {‘92}
Paint Sludge	$11.40	$12.86 {21.43}	$24.26 {32.83}	(’91) {‘92}

‘91 Cost/Ton(‘92) x Tons=‘91 Disposal Cost

Projected ‘92 Disposal Cost

	‘91 Cost/Ton		Tons	‘91 Disposal Cost	‘92 Disposal Cost
Lumber	$104.00(152)x		746.25	$ 77,610	$114,430
Trash	$ 53.80(79)x		1,763	$ 94,823	$139,277
Paint Sludge	$ 24.26(32.82)x		94.5	$ 2,293	$ 3,102
		TOTAL:		$174,726	$255,809

Waste Calculations

Dept. 05, 19, 36

- **Average Loads Per Day**

  21 x .5 cu. yd. = 10.5 cu. yd./day

- **Average 29.4 pickups in 21 days**

  = 1.4 pulls/day

1.4 pulls/day x 42 cu. yd. Container

$$\frac{\text{10.5 cu. yd./day}}{\text{58.8 cu. yd./day}} = 17.85\%$$ **cardboard**

- **Assume 15% Cardboard**

  2100 lbs./day

  over 1 ton/day

MI DEQ & RETAP Pollution Prevention (P2) Training

The Next Steps: P2 in Painting Operations

Cam Metcalf, Executive Director
Richard Meisenhelder, P2 Specialist
Lori Hoetker, Technical Coordinator
Kentucky Pollution Prevention Center (KPPC)

Kentucky Pollution Prevention Center